BEFORE THE STATE OF WASHINGTON
ENERGY FACILITY SITE EVALUATION COUNCIL

In the Matter of Application No. 99-1 SUMAS ENERGY 2 GENERATION FACILITY	APPLICATION NO. 99-1 EXHIBIT _____ (SLH-T)

DEPARTMENT OF ECOLOGY'S PREFILED DIRECT TESTIMONY

STEVEN L. HOOD

Q: Please state your name for the record.

A: Steve Hood.

Q: Where do you work and what is your title?

A: I work for the Washington State Department of Ecology (Ecology) out of the Bellingham Field Office. My title is Water Quality Engineer.

Q: How long have you worked there?

A: Since April 1, 1998.

Q: Have you attached a Curriculum Vitae to your prefiled testimony?

A: Yes, I have. It is Ecology's Exhibit ____ (SLH-1) to this prefiled testimony.

Q: Does this fully describe your work experience and education?

A: Yes, it does.

Q: Are you familiar with the application filed by Sumas Energy 2, Inc. (Sumas 2) for the proposed Sumas Energy 2 Generation Facility?

A: Yes.

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Q: Have you reviewed any material regarding this project?

A: Yes. I reviewed the following documents:

(1) draft Environmental Impact Statement (DEIS) dated March 2000;

(2) selections from Sumas 2's Application for Site Certification Agreement revised January 2000;

(3) Prefiled Direct Testimony of John Wong;

(4) Prefiled Direct Testimony of Margaret Curtis; and

(5) copy of a drawing by Wilson Engineering titled "Preliminary site grading & Drainage Plan".

Q: What area of expertise will your testimony discuss?

A: I have been asked to review the project for water quality impacts. Specifically, my testimony will focus on the proposed stormwater detention system. I will discuss water quality controls and stormwater best management practices, which are required or recommended to be implemented during construction and facility operation.

Q: Have you reviewed the applicant's proposed stormwater plan?

A: I reviewed the plan as described in the Draft EIS dated March 2000. I understand from Mr. Wong's testimony that the stormwater plan has been altered but the only information I have seen to date is the engineering drawing titled "Preliminary Site Grading & Drainage Plan." This drawing shows the alterations described by Mr. Wong in his testimony. The alterations do not appear to address the issue of detention for storms greater than ten years.

Q: What is your evaluation of the stormwater plan you reviewed?

A: There are two main deficiencies of Sumas 2's proposed stormwater detention system: (1) the impacts of flooding on the stormwater system and how the impacts would be mitigated are not clearly identified; and (2) as currently designed, the stormwater system would excessively impact downstream landowners through increased streambank erosion and increased flooding.

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Q: Before you discuss the specifics of your comments on the proposed stormwater plan, could you explain how a stormwater detention system works?

A: The stormwater is routed to a detention pond. The outlet of the pond is through a structure designed to limit the rate of discharge to match the rate of discharge from the predeveloped site.

Exhibit ____ (SLH-2), titled Full Control Structure, is a typical outlet control structure. The structure would typically be housed in a manhole with the pipe to the right discharging off site. The vertical pipe, called a riser, is open at the top and has a small orifice at the bottom. The orifice is sized so that as water is backed up in the pond the maximum flow through the orifice during a 2 year 24 hours storm would be no greater than one half of the flow that would have come off the site before it was developed during a 2 year 24 hour storm. The horizontal line marked "2 YR. MAX" represents the highest amount of water would that accumulate during a 2 year 24 hour storm. Above that line is an orifice labeled "10 YR ORIFICE" which allows additional water to be discharged for storms of greater intensity as the level of the water in the detention pond increases. The orifice is sized such that during a 10 year 24 hour storm the peak discharge flow would match the peak discharge from the predeveloped site. The line marked "10 YR. MAX" is the maximum level to which water would rise during a 10 year 24 hour storm. The notch marked "100 YEAR NOTCH" is sized to limit peak discharge of the 100 year 24 hour storm to the predeveloped site peak discharge from the 100 year 24 hour storm. The top of the riser is marked "TOP OF RISER" and is set to the same elevation as "100 YR. MAX", which represents the highest level that water would reach during a 100 year 24 hour storm.

Exhibit ____ (SLH-3), titled Partial Control Structure, illustrates how a control structure for a similar situation would be modified if there was no requirement to limit the peak from storms of greater recurrence interval than the 10 year storm. In that figure, the top of the riser is where the bottom of the 100 year notch would be.

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Ecology's Stormwater Manual requires the use of a detention pond and control structure that would limit the peak from a 2 year 24 hour storm to one half of the predeveloped peak from the same storm. It would also limit the runoff from the 10 year 24 hour storm and the 100 year 24 hour storm to match the predeveloped peak for the respective storms.

Q: In what way are flood impacts on the stormwater system proposed by Sumas 2 not adequately addressed?

A: Several catch basin rim elevations in the stormwater system are below the stated flood elevation. Therefore, during flooding the stormwater system will not be functional as designed. Stormwater leaving the site may bypass treatment systems, resulting in discharge of water that does not meet state water quality standards.

Q How should this problem be addressed?

A: The Stormwater Pollution Prevention Plan that Sumas 2 prepares for the Industrial Stormwater NPDES Permit should identify to what extend the stormwater system will be flood proofed and under what conditions the stormwater treatment will no longer function. Additional source control measures should be deployed that will eliminate the need for treatment during those instances when conditions that are likely to lead to failure of the stormwater treatment system exist.

Q: How will the project excessively impact downstream landowners?

A: By providing detention only for the 10 year 24 hours storm, all storms of greater intensity will have excessively high discharge rates. This will cause a larger, more concentrated volume of water to be directed to the downstream properties, resulting in greater stream bank erosion and flooding impacts.

Q: Why would this occur?

A: Increased flooding and stream bank erosion will be caused by excess water being diverted into the stream channel during storm events. I have prepared two exhibits to illustrate the rate of stormwater water flows using various flow controls. Exhibit ____ (SLH-4), Comparison of

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Stormwater Controls A and Exhibit ____ (SLH-5), Comparison of Stormwater Controls B, show peak discharge volumes for a number of storms for several scenarios, calculated using WaterWorks, a program for hydrologic modeling. In each instance, the basin modeled is the 10 acre site used in the Ecology Stormwater Manual. In the predeveloped conditions it is 10 forested acres. In the developed condition, 3.9 acres have been converted to impervious surface.

Exhibit ____ (SLH-4) shows the stormwater runoff rates from the modeled basin in four different development scenarios. The predeveloped scenario is what would be discharged for various storms if the site were not developed. The Fully Controlled scenario is where the procedures in the Ecology Stormwater Manual are followed. The Partially Controlled scenario is what would result from using a control structure like in the figure titled Partial Control Structure, Exhibit ____ (SLH-3), where the riser is 24 inches in diameter. The Undetained scenario is rate of flow into the detention structure and would be the flow out of the pond in the absence of any control structure.

Exhibit ____ (SLH-5) focuses on the range from 10 year 24 hour to 100 year 24 hour recurrent storms given the level of stormwater control in place. As can be seen, under the Fully Controlled scenario which utilizes the controls required by the Ecology Stormwater Manual, there is a close match between the Fully Controlled and Predeveloped scenarios at the 25 year, 50 year and 75 year 24 hour storms. Using only a partial control structure results an ever-increasing excess peak flow as the use of a larger riser results in even larger excess flows. If the pond were to reach capacity the flows could approach those of the Undetained scenario.

In both instances, the excess peak flows put additional water into the receiving water body at a time when high flows are likely to be causing stream channel modifications and the flooding of downstream properties.

Q: How can the impacts on other landowners be mitigated?

A: I can recommend three options.

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(1) Provide storage higher on the site to limit flows to the pond during storm events when it is likely to be flooded. Match pre and post developed peak flows from the 100 year storm.

(2) Design the stormwater detention pond to the specifications of the Ecology Stormwater Manual. As can be seen in the exhibits, adhering to the Ecology Stormwater Manual mitigates the flows between the 10 and 100 year 24 hours storms. It is also possible that a 100 year 24 hour storm may occur with out causing flood waters to rise to the 100 year flood elevation.

(3) Select the largest recurrence interval where the pond will be functional. Match post-development and pre-development peak flows for that recurrence interval instead of the 100 year 24 hour storm.

Q: Do you provide input into the issuance of Clean Water Act Section 401 water quality certifications?

A: Typically I am asked to review the conditions in the 401 Certification and propose any additional conditions that are necessary to provide a reasonable assurance that water quality will be protected.

Q: If Ecology had the authority to do so, would you recommend issuance of a Section 401 water quality certification?

A: Not at this time.

Q: Why not?

A: Several issues would need to be addressed:

(1) a complete Stormwater Pollution Prevention Plan as outlined in the requirements of the NPDES General Construction Stormwater Permit should be prepared and submitted to Ecology for its review and approval; and

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(2) a complete Stormwater Pollution Prevention Plan as outlined in the requirements of the NPDES General Industrial Stormwater Permit should be prepared and submitted to Ecology for its review and approval; and

(3) detention for event greater than a 10 year would also have to be addressed.

Q: What enforcement mechanisms are available to ensure compliance with water quality standards and protection of habitat?

A. The following enforcement mechanisms protect water quality and should be incorporated into the Site Certification for the proposed facility:

(1) Proponents should hire an independent environmental engineering consultant who will prepare the Stormwater Pollution Prevention Plan as required by the NPDES Construction Stormwater Permit. These plans must propose specific measures to minimize environmental impacts as described above and ensure that these measures are incorporated into the construction plan of the general contractor. The plan shall provide for upstream and downstream monitoring of the streams for settleable solids, turbidity and pH (if concrete or caustic materials are used). The results, including violations shall be retained and reported to the regulatory authority and the proponent.

(2) The regulatory findings and requirements must include a requirement for stipulated penalties to be paid automatically to the regulatory authority by the proponent.

(3) All stormwater pollution prevention plans, water quality monitoring plans, stream survey plans that determine fish populations, and monitoring results shall be submitted to EFSEC for review and approval.

Q: In summary, what measures must be taken to ensure that the construction and operation of the proposed facility will not violate state water quality standards?

A: 1) Flood proof the stormwater treatment system to the extent practicable and provide additional source control measures for conditions where it is likely to fail.

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2) Provide additional stormwater detention to protect downstream landowners from excessive stormwater discharges during events greater than the 10 year 24 hour storm.

END OF TESTIMONY

I declare under penalty of perjury that the above testimony is true and correct to the best of my knowledge.

DATED this _____ day of July, 2000.

STEVEN L. HOOD

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